

Blueshift – April 2010

On the Edge of Space

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Maggie: Welcome to the May 2010 episode of Blueshift, the podcast from NASA's Goddard Space Flight Center. I'm Maggie Masetti.

How many of us have wanted to be astronauts since we were kids? I know I did. And I know I'm not the only one.

Right now, manned spaceflight's future may be somewhat uncertain, but it appears that there might be new opportunities opening up for those wishing to experience a trip to space. One of these is the idea of doing science aboard sub-orbital flights. Joe Hill, a scientist here at the ASD, shares the dream of becoming an astronaut. Recently, she was given the chance to participate in something called sub-orbital scientist astronaut training. The idea is that commercial sub-orbital spaceflight may be a viable option for the scientists wishing to test their projects and do their experiments in space.

Much of what Joe does here at NASA could lend itself to this sort of testing environment, and what she does is build X-ray and gamma ray instruments.

Joe: My main effort is towards building the instruments. I'm an instrument builder, so we build X-ray instruments for different applications, one of which is GEMS to look at black holes. We're building a gamma ray detector to look at terrestrial gamma rays that go off with the lighting. And then, gamma ray bursts as well. So we design the instrument, and build the instrument and then help the engineers with what the science requirements are.

Maggie: How well do the instruments she builds mesh with the idea of testing them in sub-orbital space? And has NASA ever tested things sub-orbitally before?

Joe: Up until recently, the sub-orbital science program has been involved with sub-orbital balloons and sub-orbital rockets, sounding rockets that go up and basically have five minutes of time in space. With the new commercial push to doing these, sort-of, space planes, they're looking now, they're getting very close to carrying passengers on the space planes, so now they're looking at what research could be done. If a scientist could fly on one of these space planes and get into space...into the sub-orbital region of space for five minutes, what kind of experiments could they do? And NASA's looking to see what experiments could be done, how interesting it would be for science, and if it's a new way of making different measurements, also in the atmosphere.

Maggie: Because this training was not sponsored by NASA, rather it was an outside commercial company, we wondered if there were any problems with her participation in it.

Joe: So, I'm a contractor at NASA, I work for Universities Space Research Association. They're very interested in these sub-orbital vehicles and how they could be used for science. So actually USRA in collaboration with Southwest Research Institute put together a program with NASTAR, which is the training center, to train up some scientists in what it would be like to travel in one of these space planes and for us to get a feel for what kind of experiments we'd be able to do. So yes, I had to take time away from my NASA program, but it was funded through my Institute. The president of our company actually knows I want to be an astronaut, and so he was keen to help me with that. And also we have a concept study for putting a gamma ray detector on one of these sub-orbital vehicles, that's funded through NASA, so with that in place, it made sense for me to be able to go, but I still feel very lucky that I had the opportunity.

Maggie: Joe told us what about her training was like, and how realistic it was to a real sub-orbital flight.

Joe: It was absolutely amazing. I mean, I've never been to space, it's one of my dreams, but as far as I could tell, going on the centrifuge and the way that they did the simulation was as close to going into space as you could do without actually doing it. Apart from the weightless part at the top, the takeoff and coming in towards landing was so realistic. In the morning they did two training sessions, one was for Gx, which is basically the force of gravity on your chest and then following that they did Gz, which is the gravity pushing down on your head, which is very difficult to cope with because it's pushing all your blood down to your feet, so you start to pass out. In fact you lose some vision and to counteract that, you have to constrict your blood vessels to pump your blood up into your brain so you stay awake. So we got through those tests in the morning, and then in the afternoon we get to do the flight profile and they have all the visuals in the screen. You're in this little cabin and you have visuals showing the taking off from Earth and seeing the sky, and it's just very, very realistic, all the sound and everything. It's really great.

Maggie: What comes next, especially when even the prospect of commercial spaceflight seems far off.

Joe: Following from the training there was a conference in Boulder, just recently and the NASA headquarters guy showed up and they said they're going to put \$15 million per year for 5 years, to fund these opportunities. And so what we're hoping is with that concept study, we're going to be looking at ...as I said, it's called Firefly on Demand, it's going to be looking at the gamma rays coming from terrestrial lightening. I'm hoping from the concept study we can come up with something NASA will think is viable and maybe use this \$15 million to fly something. One of the things that's clear is that though industry is making great strides in getting people up there, they're just not quite there yet. So within a year, I believe, they're going to start making unmanned flights – obviously the pilot will be onboard, but not taking scientists. And NASA, I think, once they get a good feel for how safe it'll be will start funding scientists to go up there and do real science.

Maggie: Does pursuing sub-orbital flight mean giving up on the dream of being a NASA astronaut?

Joe: I'm a foreign national at the moment so I can't apply to NASA, hopefully in the next couple of years when I get citizen ship, I'll be able to apply to NASA. ESA also is a good opportunity, to apply there. I mean, any opportunity that would come up, I would definitely apply. But the idea of taking up your own experiment would be the cake and eat it kind of thing. The other thing is, the commercial vehicles, compared to going...the people that paid to go up onto the space station paid I think it was \$15 million, on the space plane is \$200,000. Which I can't afford myself, but maybe, you know, NASA would fund us to go do an experiment for \$200,000. It's a lot less than \$15 million!

Maggie: We actually learned about Joe's sub-orbital astronaut training when we ran across a blog entry she wrote for Nature. We soon learned she had a twitter account and had tweeted about it as well. As devotees of social media ourselves, we were interested in how these things were incorporated into her experience.

Joe: Up until this opportunity, I'd never tweeted or blogged, actually. We were encouraged to do some public outreach, to try to gain some enthusiasm, both within the scientific community, and also with the public. Education and outreach on these sub-orbital vehicles is a big part. So not only is there science, but outreach to students that could be building their own experiments. So they were encouraging us to get out there, and sort of make links to the public so the next generation of scientists and engineers would be able to be involved. And so I set up my twitter account. But it was a really nice way to be able to go and tell people what you were feeling and how things were going. People seem to be really interested in this new way of doing science. As one of the lucky ones that got the chance to do the training, I thought it was important to explain to people what it was like.

Maggie: But will she keep on tweeting?

Joe: Since then I've found other things that I could tweet, that people would be interested in. Up til then, I thought about, what do I do that anyone cares about, that I would tweet about. But having had that experience and feeling that there were several things going on in that particular day where you just needed one or two lines to explain what was going on. And so people could feel like they were taking part with you. Other opportunities have also occurred to me in the meantime, so I've been able to tweet about those as well. And the same with blogging. It's really made me look at what I do in a different perspective. And say, ok...like the conference for instance...this would be interesting to people who aren't at the conference, and they can read up and see what's going on.

Maggie: We hope that Joe does keep finding ways to reach out, because her sharing her experience may inspire someone else. Meanwhile, Joe's childhood dream remains ...

Joe: That's how I've ended up at NASA actually – it's all I've ever wanted to do since I watched Star Wars when I was like 5, was be an astronaut. It's been a windy path, but

eventually, you know, building instruments and things...this actually... I applied to be an astronaut at ESA a couple of years ago. I made it through the first round, but I didn't make it too far. I was really disappointed. So these new space vehicles, where you can take your experiment into space and do an experiment would be phenomenal. It's not just going into space and doing someone else's experiment, you can take your own science and go make the measurements yourself, which would be superb.

Maggie: We hope all this will become a reality for her. It's brought her a long way already – only 50 vertical miles or so to go. If you want to follow Joe Hill on twitter, she's @spacepurple. If you want to follow us on twitter, we're @NASABlueshift. Check out our website for links to Joe's blog, and more about the program she went through. We'll see you soon with another new podcast. This is Maggie Masetti bringing the universe closer to you, with Blueshift.

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